FACT SHEET

Western Interconnection Synchrophasor Program (WISP)

Overview
A project is well underway to improve the reliability of the bulk electric power grid that spans the West. Led by the Western Electricity Coordinating Council (WECC), the Western Interconnection Synchrophasor Program (WISP) is installing more than 300 new or upgraded Phasor Measurement Units (PMU). It is tying the PMUs together with a secure communications network, and is deploying the software tools needed to manage an increasingly complex power grid.

These tools allow system operators to see power system vulnerabilities much better, and therefore help minimize the risk of these vulnerabilities evolving into a major disturbance or blackout.

Synchrophasor technology also can provide the ability to see and manage the intermittent nature of renewable resources, and to deploy the ancillary services needed to solidify the changing nature of the West's generation fleet.

WECC is one of eight Regional Entities in North America, encompassing a geographic area equivalent to over half the United States. It is responsible for promoting electric system reliability and providing a forum for coordinating the operating and planning activities of its member organizations. WECC members — representing all segments of the electric industry — provide electricity in 14 western states, two Canadian provinces, and portions of one Mexican state.

WISP Participants
WISP has eight cost-share participants in addition to WECC: Bonneville Power Administration, California ISO /California Energy Commission, Idaho Power Corporation, NV Energy, PacifiCorp, Pacific Gas & Electric, Southern California Edison and the Salt River Project.

There are 10 additional invited entities that have agreed to participate: Alberta Electric System Operator, Arizona Public Service, BC Hydro, Los Angeles Department of Water and Power, Northwestern Energy, Public Service of New Mexico, San Diego Gas and Electric, Tri-State G&T, Tucson Electric Power Company, and the Western Area Power Administration.

WISP At-A-Glance

Recipient: Western Electricity Coordinating Council (WECC)

States: AZ, CA, CO, ID, MT, NM, NV, OR, SD, TX and WA

NERC Region: WECC

Total Budget: $107,780,000

Federal Share: $53,890,000

Project Type: Electric Transmission Systems

Targeted Benefits

- Deferred Investment in Transmission Capacity Expansions
- Reduced Ancillary Service Cost
- Reduced Wide-Scale Blackouts
- Increased Electric Service Reliability
- Improved Utilization of Intermittent Renewable Generation

Equipment

- 300 PMUs
- 50 PDCs
- Transmission Systems Communication

Advanced Applications

- Angle and Frequency Monitoring
- Voltage and Voltage Stability Monitoring
- Post-Mortem Analysis
- Oscillation Energy & Mode Meter Monitoring
- Reactive Reserves Monitoring & Device Control
- Model Baselining, Validation & Improvement
- Path Loading and Congestion Management

Timeline and funding
WISP started in 2010, when WECC received $53.9 million from the U.S. Department of Energy (DOE). Awarded under the American Recovery and Reinvestment Act's Smart Grid Investment Grant initiative, the funding matches dollars already committed by nine WISP participants to extend and deploy synchrophasor technologies within their electrical systems. Slated for completion in 2013, the total funding for WISP is $107.8 million.

WISP Benefits

- **Large-scale outage avoidance –** Improving wide-area situational awareness and wide-area controls can reduce the frequency of large-scale, long-duration outages originating in the bulk power grid. Each outage that does not occur represents substantial savings to customers in terms of avoiding lost production and amenities. For large cities, a major outage typically has customer costs valued in the hundreds of millions of dollars.

- **Increased transmission usage –** Currently, transmission facilities are not used to optimal capacity in the Western Interconnection. With WISP, available transmission capacity will be based, in part, on precise, real-time measurements; rather than on slower, coarser measurements or simulation methods, such as transmission path nomograms. This will increase the effective capacity of selected congested lines and increase transmission asset usage, thus lowering energy costs to consumers.

- **Increased use of intermittent renewable generation –** An exciting component of WISP is improving the use of wind and other renewable generation. Synchrophasor technology will improve the visibility of transmission, generation, and load conditions. Therefore wind resources will be better used, increasing their capacity factors.

What is a synchrophasor?

Synchrophasors are precise grid measurements now available from monitors called phasor measurement units (PMUs). PMU measurements are taken at high speed (typically 30-120 observations per second – compared to one every 2-4 seconds using conventional technology). Each measurement is time-stamped according to a common time reference. Time stamping allows synchrophasors from different utilities to be time-aligned (or "synchronized"). Combined together, they provide a precise and comprehensive view of the entire interconnection. Synchrophasors enable a better indication of grid stress, and can be used to trigger corrective actions to maintain reliability. (*source: www.NASPI.org*)

- **Reduced Capacity Firming Costs for Intermittent Generation** – Intermittent renewable resources typically have low, firm capacity values and, as the penetration of these resources increases, the system must be augmented by firm capacity resources to maintain grid reliability. WISP will increase visibility of these resources, enabling a reduction in operating reserves.

- **Critical Infrastructure Protection (CIP) and Cyber Security –** The new, private network architecture is not only scalable, it can accommodate the anticipated enhanced levels of cyber security and NERC CIP controls.